MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Anastasio Alfaro, Director of the National Observatory, San José, Costa Rica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian, which is exactly five hours behind Greenwich time, is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

NOTE ON EVAPORIMETERS.[1]

By B. F. E. KEELING, Superintendent Precise Survey, Survey Department, Egypt. Dated Helwan Observatory, Helwan, Egypt, January 2, 1906.

The following note on evaporimeters is suggested by an article on the Piche evaporimeter in the MONTHLY WEATHER REVIEW for June, 1905.

In view of the all important question of water supply in Egypt, evaporimetry is a subject of great interest to meteorologists here. A systematic investigation of the actual evaporation from different classes of water surfaces and cultivated land is being undertaken.

The article in the MONTHLY WEATHER REVIEW for June, 1905, pages 253–5, gave a résumé of Prof. Thomas Russell's experiments on the Piche evaporimeter. A comparison of the values obtained with the different evaporimeters installed at the Helwan Observatory [of the Survey Department, latitude 29° 51′ 34″ N., longitude 31° 20′ 30″ E.], will probably be of interest.

(A) The instrument which has been considered as standard has been an open pan Wild evaporimeter mounted in a Renou screen, one and one-half meters by one meter, with double louvred walls. The pan has an area of 250 square centimeters, or about seven and one-half times that used by Professor Russell. When full the water surface is 1.3 centimeters below the rim. Besides this two other evaporimeters have been observed at irregular intervals during the past year.

(B) Of these one is a Piche evaporimeter mounted in the same screen as the Wild instrument. The evaporating surface of the paper disk is about 11.4 square centimeters in area.

(C) The other is an instrument recently designed by Mr. E. B. H. Wade, of the Survey Department of Egypt. Outside the observatory is a tank four meters square and one meter deep, filled with water. In the center of this is a zinc cylinder 50 centimeters in diameter which receives a separate supply of water. The water in this cylinder is automatically maintained to a constant level by an instrument which at the same time measures the quantity of water supplied, i. e., the quantity evaporated from the inner water surface. The water in the outer tank merely acts as a guard ring. The water is fully exposed to sun and wind.

In the accompanying Table 1, are given the ratios Piche/Wild and Wade/Wild. It will be seen that the mean ratio Piche/Wild is 1.45, or about 10 per cent greater than the factor found by Professor Russell. This is probably accounted for by the difference in dimensions of the evaporimeters used, particularly by the relatively large size of the Wild pan. The ratio Wade/Wild is 1.37.

Taking only the months August, October, November, and December of 1905 the ratio Wade/Piche is 0.96.

TABLE 1.—*Comparison of the Wade, Wild, and Piche evaporimeters.*

Month.	No. of days.	Mean evaporation by Wild.	Ratio—Wade/Wild	Difference from final mean.	No. of days.	Mean evaporation by Wild.	Ratio—Piche/Wild	Difference from final mean.
1904.		*mm.*		*Per cent.*		*mm.*		*Per cent.*
August	27	9	1.45	+6	.....	.....	.....	.....
September	13	8	1.37	0	.....	.....	.....	.....
1905.								
May	24	14	1.33	−3	.....	.....	.....	.....
June	28	13	1.37	0	.....	.....	.....	.....
July	6	9	1.49	+9	.....	.....	.....	.....
August	23	10	1.44	+5	31	10	1.45	+1
September	5	12	1.41	+3	28	9	1.52	+6
October	24	9	1.29	−6	31	10	1.39	−3
November	29	7	1.32	−4	29	7	1.45	+1
December	23	4	1.38	+1	22	4	1.39	−3
	Weighted mean		1.37		Weighted mean		1.44	

NOTE.—The weighted means above given will vary in accordance with the adopted system of weights. If, for instance, we give the respective ratios for the last five months equal values without regarding the number of days of observation or the quantity of evaporation we get the following results:

Wade/Wild = 1.37
Piche/Wild = 1.44
Wade/Piche = 0.95

If, on the other hand, we give weights depending on the total quantity of evaporation, or the product of the number of days in the second and sixth columns by the millimeters in the third and seventh columns, respectively, then we get the following results:

Wade/Wild = 1.36
Piche/Wild = 1.44
Wade/Piche = 0.94

In general the average of any series of observed ratios is correctly found only by reducing each to a common denominator, and then giving each a weight corresponding to its own specific reliability.

[1] By permission of the Director General, Survey Department, Egypt.

In the present case, since nothing is known to the contrary, and since we rather roughly assume that the ratio is the same with all humidities, temperatures, and winds, the mean ratio for any given month must be obtained by dividing the sum total of the daily evaporations measured with one instrument by the corresponding sum total of the simultaneous observations with the other instrument. In the same way the average for several months would be the ratio of the sums of the daily evaporations for the whole period, as measured simultaneously with any two instruments.—EDITOR.

THE NEPHOLOGICAL REVIEW.

The students of meteorology will not be surprised to find that certain branches of this broad subject have been prosecuted to such an extent that special journals have begun to appear, such as the Beiträge, or Contributions to the Physics of the Free Atmosphere, which is devoted to the more difficult problems from an observational and theoretical point of view. But the newest journal, namely, La Revue Néphologique, published by A. Bracke, at Mons, Belgium, will appeal to a very wide circle of observers. The lessons to be learned from a study of the clouds are as yet but slightly appreciated by either observers, or theorists, or forecasters. The main trouble is that we have no simple method of recording cloud structure and phenomena. Photographs are helpful, but they tell us the internal motions of clouds only when we closely compare several photographs, taken at very short intervals of time. So very few observers are furnished with photogrammeters that we are generally forced to rely upon the very inartistic sketches of the ordinary observers. May the journal of Doctor Bracke stimulate interest and work in this important line of research, and develop a special class of observers who will investigate the minuter details of cloud formation.—*C. A.*

STORM AND HURRICANE INSURANCE IN THE WEST INDIES.

In the matter of insurance of plantations in the West Indian Islands against "damage by hurricanes," we would call attention to the general remarks of Mr. Howard E. Simpson, on "Tornado Insurance," published in the December, 1905, REVIEW.[1] The term "hurricane," like "tornado," can not be so defined but that the insurance companies will often be legally and properly able to evade payment of losses. It is in the interest of the insured, and of fair business dealing, to introduce into the tornado policy provisions against destruction by the directly destructive agents, i. e., wind, waves, rain, drought, frost, hail, lightning, and omit the indirect, less definite terms, tornado, hurricane, cold wave, thunderstorm, etc. For centuries we have insured against loss by accidental fire, without pretending to mention the specific agencies that may start the fire. We insure a plate glass or a mirror against loss by accidental breakage without specifying that the break must be due to a runaway horse or a stone thrown by a boy. We can not imagine that a merchant will insure his goods in the West Indies against the wind or lightning that accompanies a hurricane and not also insure it against the wind or lightning that may occur without any connection with a hurricane. The complex combinations of winds, waves, lightning, and hail involved in the idea of a hurricane, tornado, or blizzard need not enter into the text of an insurance policy, but should certainly be replaced by special mention of the directly destructive individual agents. The Weather Bureau has no desire to see the insurance business conducted in such a way that local observers will be daily called upon to testify in the courts as to whether certain destruction has been caused by a hurricane or not. At some of our stations the official in charge is overrun with subpœnas requiring him to bring his records into court and to stand a cross examination on the weather. It is to be feared that this new departure in insurance will both increase these labors and responsibilities and also increase the ease with which insurance companies evade the payment of losses.

The rate of insurance against damage by tornadoes could, as was shown by Mr. Simpson, be included safely in the ordinary rate against loss by fire and other sources of damage or in the ordinary marine risk. The same remark may be made as to insurance against loss by hurricane. Destruction of plantations, crops, and buildings by hurricanes is a rare occurrence, and if the policy be restricted to damage done by rain or floods within a continuous twenty-four-hour period accompanying a gale or hurricane, then the risk is still further diminished. As tropical buildings of all kinds are of slight structure, and as tropical plantations rapidly recover from a hurricane, the injury done by the latter on land is apt to be overestimated. Probably the fright and the disheartenment and the change in business relations, leading sometimes to the complete desertion of the island or neighborhood, is more important than the direct loss on the property.—*C. A.*

[1] Vol. XXXIII, pp. 534–539.

CLOUD BANNERS.

Every one who has lived among mountains has seen the clouds formed by the currents of moist air moving up the slopes. Sometimes the strong wind prevails only near the very top of a mountain, in which case the cloud forms a hood or cap, closely fitting and hiding the mountain top. At other times we have at the top a strong wind without enough moisture to form a cap cloud, a cape, or a tablecloth, as it is sometimes called; but, nevertheless, close to leeward of the mountain top, there is a small special region of slightly lower pressure, sometimes known as a region of discontinuity, analogous in many respects to the region immediately behind a pier in the strong current of a river. Into this region the air flows from all sides, producing a mass of whirls, analogous to the eddies behind a river pier, and, as it expands into this region, it expands just enough to form a slight cloud or haze, which floats like a flag or banner to leeward of the mountain top. The appearance, like smoke or steam, is apt to deceive a careless observer, for the whole phenomenon is simply a cloud, analogous to some forms of cirri. When the mountain top is covered with snow the drifting particles caught within this region of discontinuity also produce the appearance of steam or smoke, but it is simply drifted snow. A careful record of these cloud banners would add considerably to our knowledge of local climatology, since we so rarely can have observers stationed on mountain summits.

We are indebted to Mr. G. N. Salisbury, Section Director, Seattle, Wash., for a few observations on the banners of Mount Rainier, and we hope that many more may be recorded. He states that on March 6, 1906:

> The mountain was visible and entirely clear when I left my home on the hills at 7:15 a. m. About 8:30 a. m. the captain of the small excursion steamer *Acme* on Lake Washington, adjacent to this city, telephoned to me that there was apparently a heavy column of smoke or steam ascending from the peak of Mount Rainier and that a large number of people were watching it from the shore of the lake. * * * It could be plainly seen from the State University, where it was observed by Prof. Henry Landes, of the chair of geology, who declared it to be merely a good specimen of a cloud banner, due to a warm south wind blowing over the peak. Professor Landes has made several ascents of the mountain, and is well versed in mountain lore.
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> The phenomenon has been observed several times before. * * * A similar appearance was noticed in December, 1894, and caused some remark. The Post-Intelligencer sent an expedition to the mountain at that time, but of course they could not get to the top at that season, only to the 9000-foot level. It was determined that the phenomenon noticed then was caused by masses of snow being carried by violent southwest winds across the lip of the crater, giving the appearance of masses of smoke, as the snow was broken into fine particles.
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> There are, however, steam caverns in the crater, from the crevices of which a warm mist ascends in summer, as has been experienced by parties who have ascended the mountain and slept in the crater.

C. A.